contraction of the core 110f. In this embodiment, both the upper strongback 143f and the upper panel 166f of the shell 160f can be position adjacent or in contact with the inlet duct as the inlet duct does not move relative to them. Although not shown, a manifold tube can be positioned in the inlet manifold 116 and attached to the lower portion of the bellows 180f.

In other embodiments of the present invention a higher temperature fluid enters the core at the inlet, is cooled in the core and exits at the outlet at a lower temperature. Also, a separate lower temperature fluid enters the inlet of the shell, is heated as it passes through the core and exits the shell at the outlet at a higher temperature. In such embodiments the core functions to reduce the temperature of the fluid passing through it. In these embodiments the mount (e.g. mounts 200a-f) is positioned adjacent the input to the core and the flexible connector (e.g. bellows 180a-f) is positioned at the output of the core. In this manner, the core has a minimum amount (if any) of differential expansion or contraction near the higher temperature fluid port of the core. This eliminates the need for an expensive and complex flexible connector to be employed at the higher temperature fluid port to carry the high temperature fluid. Also, with the flexible connector positioned at the lower temperature fluid port of the core, the flexible connector can be constructed to carry lower temperature fluid. This reduces the cost and complexity of the heat exchanger.

While the preferred embodiments of the present invention have been described in detail above, many changes to these embodiments may be made without departing from the true scope and teachings of the present invention. The present invention, therefore, is limited only as claimed below and the equivalents thereof.

WHAT IS CLAIMED IS:

1. A heat exchanger comprising:
    a. a core having a variable size, a first port and a second port;
    b. a support structure; and
    c. a mount positioned between the core and the support structure adjacent the second port, wherein the mount restrains the core such that the core varies in size away from and towards the mount.

2. The heat exchanger of Claim 1, further comprising a deformable connector

attached to the core, such that the deformable connector and the first port are in fluid communication as the core varies in size.

3. The heat exchanger of Claim 1, wherein the mount comprises a pin and a receiver, wherein the receiver receives the pin to restrain the core.

4. The heat exchanger of Claim 3, wherein the pin is attached to the support structure and wherein the receiver is defined in the core.

5. The heat exchanger of Claim 3, wherein the pin is attached to the core and wherein the receiver is defined in the support structure.

6. The heat exchanger of Claim 1, wherein the mount comprises a core receiver, a support structure receiver and a pin having a first end and an opposing second end, wherein the core receiver is defined in the core, wherein the support structure receiver is defined in the support structure, and wherein the core receiver receives the first end of the pin and the support structure receiver receives the second end of the pin.

7. The heat exchanger of Claim 4, further comprising a deformable connector attached to the core, such that the deformable connector and the first port are in fluid communication as the core varies in size.

8. The heat exchanger of Claim 7, wherein the first port is a lower temperature fluid port and the second port is a higher temperature fluid port.

9. The heat exchanger of Claim 8, wherein the deformable connector is selected from the group of a bellows and a flexible hose.

10. The heat exchanger of Claim 2, wherein the first port is a lower temperature fluid port and the second port is a higher temperature fluid port.

11. A heat exchanger comprising:

a. a laterally expandable core having a variable size, a lower temperature fluid port and a higher temperature fluid port;

b. a support structure;

c. a mount positioned between the core and the support structure adjacent the higher temperature fluid port, wherein the mount restrains the core such that the core varies in size laterally away from and towards the mount; and

d. a deformable connector positioned such that the deformable connector and the lower temperature fluid port are in fluid communication as the core varies in size.

12. The heat exchanger of Claim 11, wherein the deformable connector is selected from the group of a bellows, a flexible hose and a braided metal hose.

13. The heat exchanger of Claim 12, further comprising a substantially rigid connector positioned such that the deformable connector and the higher temperature fluid port are in fluid communication.

14. The heat exchanger of Claim 13, wherein the mount comprises a pin and a receiver, wherein the receiver receives the pin to restrain the core.

15. The heat exchanger of Claim 14, wherein the pin is attached to the support structure and wherein the receiver is defined in the core.

16. The heat exchanger of Claim 14, wherein the pin is attached to the core and wherein the receiver is defined in the support structure.

17. The heat exchanger of Claim 12, wherein the mount comprises a core receiver, a support structure receiver and a pin having a first end and an opposing second end, wherein the core receiver is defined in the core, wherein the support structure receiver is defined in the support structure, and wherein the

core receiver receives the first end of the pin and the support structure receiver receives the second end of the pin.

18. The heat exchanger of Claim 15, wherein the pin is attached to the support structure by one from the group of a weld, a brazing and an adhesive.

19. The heat exchanger of Claim 15, wherein the pin is formed with the support structure.

20. A recuperator comprising:

a. a laterally thermally expandable core having a variable size, a core inlet and a core outlet;

b. a support structure having a shell with opposing ends, a upper strongback, a lower strongback, a set of tie rods, wherein the core is received in the shell, wherein the upper strongback and lower strongback are positioned on the opposing ends of the shell, wherein the upper strongback and the lower strongback are connected with the set of tie rods;

c. a mount positioned between the core and the support structure adjacent the outlet of the core, wherein the mount comprises a pin and a receiver, wherein the pin is attached to the support structure and wherein the receiver is defined in the core, wherein the receiver receives the pin to restrain the core, wherein the mount restrains the core such that the core varies in size laterally away from and towards the mount; and

d. a deformable connector attached to the core inlet such that the deformable connector and the core inlet are in fluid communication as the core varies in size.